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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/605,308	09/22/2003	Xiangdong Chen	FIS920030266US1	2307

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INTERNATIONAL BUSINESS MACHINES CORPORATION  
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EXAMINER

MAI, ANH D

ART UNIT	PAPER NUMBER
2814	

DATE MAILED: 01/21/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/605,308

Applicant(s)

CHEN ET AL.

Examiner

Anh D. Mai

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 22 September 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 11-20 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 10 is/are allowed.
- 6) ☒ Claim(s) 1 and 4-9 is/are rejected.
- 7) ☒ Claim(s) 2 and 3 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 September 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 9/22/2003.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Election/Restrictions***

1. During a telephone conversation with Mr. H. Daniel Schnurmann, Reg. No. 35,791 on January 11, 2005 a provisional election was made without traverse to prosecute the invention of semiconductor device, Group I, claims 1-10. Affirmation of this election must be made by applicant in replying to this Office action. Claims 11-20 have been withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.
2. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

### ***Specification***

3. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.
4. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required:

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Claim 7, recites: “the conductor contact structure of claim 6, wherein said borderless bitline contact includes heavily doped polysilicon.

Claim 8, recites: “the conductor contact structure of claim 7, wherein said borderless bitline contact includes a layer of metal silicide disposed above said heavily doped polysilicon.

These limitations appear to referred to the conductive line (302) not the borderless bitline contact (332) because: in the specification, the borderless bitline contact (332) comprises only one layer (See Fig. 3B, and [0032]), while conductor line (302) comprises two layers (313, doped polysilicon and 317, metal or metal silicide). (See Fig. 3A-B).

### *Drawings*

5. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the “borderless bitline contact includes a layer of metal silicide disposed above the heavily doped polysilicon” (as recited in claim 8) must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes

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made to the brief description of the several views of the drawings for consistency.

Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 6-9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 6 recites the limitation "said conductor contact structure further comprising" in lines 3-4. There is insufficient antecedent basis for this limitation in the claim. Neither claims 1 nor claim 4 recite a conductor contact structure.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

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(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1 and 4 are rejected under 35 U.S.C. 102(b) as being anticipated by Watabe et al. (U.S. Patent No. 5,146,291).

Watabe teaches a conductor line stack as claimed including:

a layer of a first material (3);

a layer of a second material (4) formed on the layer of first material (3), the layer of second material (4) having an upper portion (4c) and a lower portion (4d); and

a pair of first spacers (35) disposed on sidewalls of the upper portion (4c), the lower portion (4d) having width defined by a combined width of the upper portion (4c) and the pair of first spacers (35). (See Fig. 14E).

With respect to claim 4, the conductor line stack of Watabe further comprises an insulating cap (35) disposed over said layer of second material (4), and second spacers (36) disposed on sidewalls of the first spacers (35), on sidewalls of the lower portion (4d) and on sidewalls of the layer of the first material (3). (See Fig. 14G).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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8. Claims 5-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Watabe '291 as applied to claim 4 above, and further in view of Divakaruni et al. (U.S. Patent No. 6,426,247).

With respect to claim 5, Watabe teaches a conductor line stack as described in claim 4. Thus, Watabe is shown to teach all the features of the claim with the exception of disclosing a conductor contact structure.

However, Divakaruni teaches a conductive contact structure (10/29) including conductive line stack (7/2/21/22/23), and further includes: a borderless bitline (10/29) contact to a single-crystal semiconductor region (1) disposed below the conductor line stack (2/21/22/23), the bitline contact (10/29) having a sidewall contacting a sidewall of the outermost spacer (9). (See Fig. 3).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of invention to form the conductive line stack of Watabe includes a conductive contact structure as taught by Divakaruni to provide input/output to the semiconductor device.

With respect to claim 6, the conductor contact structure of Divakaruni includes a pair of conductor line stacks (2/21/22/23) oriented in parallel (into and perpendicular to the paper).

With respect to claim 7, as best understood by the examiner, the conductive line (4) of Watabe includes heavily doped polysilicon.

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With respect to claim 8, as best understood by the examiner, the conductive line of Divakaruni comprises: a layer of metal silicide (21) disposed above the doped polysilicon (22).

With respect to claim 9, the conductive line stack (2/21/22/23) of Divakaruni is separated from the single-crystal semiconductor region (1) by an array top oxide layer (23) and another conductor line stack of the pair is conductively coupled to a gate conductor of a vertical passgate transistor of a DRAM (3).

*Allowable Subject Matter*

9. Claims 2 and 3 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

10. Claim 10 is allowed.

The following is a statement of reasons for the indication of allowable subject matter: Watabe teaches that the first material includes dielectric while the first material of claim 2 comprises polysilicon or metal silicide, and the second material of Watabe is a polysilicon while the second material of claim 3 includes a metal.

Further, prior art of record either alone or in combination fail to teaches the limitation of claim 10, including: a layer of metal having an upper portion and a lower portion; the lower portion having width defined by a combined width of the upper portion and a pair of first spacers.



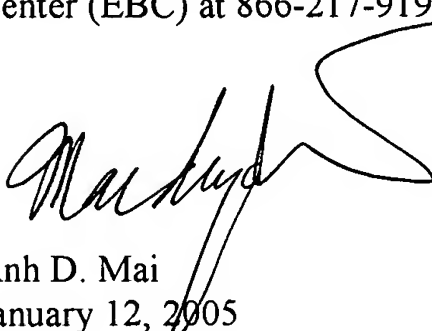
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*Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anh D. Mai whose telephone number is (571) 272-1710. The examiner can normally be reached on 9:00AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Anh D. Mai  
January 12, 2005